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An “Isothermal Radar Reflectivity” based Lightning Nowcast
Algorithm and its Real-time Application
(Abstract Only)

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Abstract

In this paper, a radar-based scheme for lightning nowcast and some preliminary real-time test results will be introduced. The algorithm is developed based on a simple conceptual model of charge production and separation in a convective cloud. Precursors for lightning initiation were identified from a set of crucial radar parameters. Research results showed that in the vicinity of Hong Kong, echo top above 7 km, vertically integrated liquid water in excess of 5 mm, 0°C reflectivity over 47 dBZ, -10°C reflectivity higher than 17 dBZ, and -20°C reflectivity above 0 dBZ are good indicators of the onset of cloud-to-ground lightning in the next, say, 10-20 minutes. Furthermore, taking the logarithm of lightning flash rate as a measure of lightning intensity, it is found that lightning intensity has an approximate linear relationship with these crucial radar parameters. The algorithm has been successfully put under real-time testing since mid spring 2007. Analysis of the test data showed that the lightning nowcast algorithm was operationally viable and valuable when incorporated in the automated nowcasting system operated by the Hong Kong Observatory.